What is claimed and desired to be secured by United States Letters Patent is:

1. A magnetic pigment flake, comprising:

a central magnetic layer having a first major surface, an opposing second major surface, and at least one side surface;

a first reflector layer on the first major surface of the magnetic layer; and

a second reflector layer on the second major surface of the magnetic layer;

wherein the pigment flake exhibits a reflectivity corresponding to the reflectivity of the reflector layers and exhibits magnetic characteristics based on the relative magnetism of the magnetic layer.

2. The pigment flake of claim 1, wherein the first and second reflector layers are on each of the first and second major surfaces but not on the at least one side surface of the magnetic layer.

3. The pigment flake of claim 2, further comprising a first dielectric layer on the first reflector layer and a second dielectric layer on the second reflector layer.

4. The pigment flake of claim 3, wherein the first and second dielectric layers are selectively absorbing and provide additional color effects to the pigment flake.

5. The pigment flake of claim 2, further comprising a dielectric layer substantially surrounding the first and second reflector layers and the magnetic layer.

6. The pigment flake of claim 5, wherein the dielectric layer is selectively

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absorbing and provides additional color effects to the pigment flake.

7. The pigment flake of claim 1, wherein the first and second reflector layers form part of a contiguous reflecting layer substantially surrounding the magnetic layer.

8. The pigment flake of claim 7, further comprising a dielectric layer substantially surrounding the reflecting layer.

9. The pigment flake of claim 8, wherein the dielectric layer is selectively absorbing and provides additional color effects to the pigment flake.

10. The pigment flake of claim 1, wherein the magnetic layer comprises a soft magnetic material.

11. The flake of claim 1, wherein the magnetic layer is composed of a material with a coercivity of less than about 2000 Oe.

12. The flake of claim 1, wherein the magnetic layer is composed of a material with a coercivity of less than about 300 Oe.

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13. The pigment flake of claim 1, wherein the magnetic layer comprises a material selected from the group consisting of iron, nickel, cobalt, iron, gadolinium, terbium, dysprosium, erbium, and alloys or oxides thereof.

14. The pigment flake of claim 1, wherein the magnetic layer comprises a material selected from the group consisting of Fe/Si, Fe/Ni, FeCo, Fe/Ni/Mo, and combinations thereof.

15. The pigment flake of claim 1, wherein the magnetic layer comprises a hard magnetic material.

16. The pigment flake of claim 1, wherein the magnetic layer comprises a material selected from the group consisting of $SmCo_5$, $NdCo_5$, Sm_2Co_{17}, $Nd_2Fe_{14}B$, $TbFe_2$, and combinations thereof.

17. The pigment flake of claim 1, wherein the magnetic layer comprises a material selected from the group consisting of Fe_3O_4, $NiFe_2O_4$, $MnFe_2O_4$, $CoFe_2O_4$, YIG, GdIG, and combinations thereof.

18. The pigment flake of claim 1, wherein the magnetic layer has a physical thickness of about 200Å to about 10,000 Å.

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19. The pigment flake of claim 1, wherein the reflector layers comprise a reflective material selected from the group consisting of aluminum, silver, copper, gold, platinum, tin, titanium, palladium, nickel, cobalt, rhodium, niobium, chromium, and combinations or alloys thereof.

20. The pigment flake of claim 1, wherein the reflector layers each have a physical thickness of about 400 Å to about 2,000 Å.

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21. A magnetic colorant composition, comprising:

a pigment medium; and

a plurality of pigment flakes dispersed in the pigment medium, the pigment flakes having a multilayer structure substantially the same as the pigment flake defined in claim 1.

22. The colorant composition of claim 21, wherein the pigment medium comprises a material selected from the group consisting of acrylic melamine, urethanes, polyesters, vinyl resins, acrylates, methyl methacrylate, ABS resins, epoxies, styrenes, ink and paint formulations based on alkyd resins, and mixtures thereof.

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23. A magnetic color shifting pigment flake, comprising:

a magnetic core section including:

a central magnetic layer having a first major surface, an opposing second major surface, and at least one side surface; and

a first reflector layer on the first major surface of the magnetic layer, and an opposing second reflector layer on the second major surface of the magnetic layer;

a first dielectric layer overlying the first reflector layer, and a second dielectric layer overlying the second reflector layer; and

a first absorber layer overlying the first dielectric layer, and a second absorber layer overlying the second dielectric layer;

wherein the pigment flake exhibits a discrete color shift such that the pigment flake has a first color at a first angle of incident light or viewing and a second color different from the first color at a second angle of incident light or viewing.

24. The pigment flake of claim 23, wherein the magnetic layer comprises a soft magnetic material.

25. The pigment flake of claim 23, wherein the magnetic layer comprises a material selected from the group comprising iron, nickel, cobalt, iron, gadolinium, terbium, dysprosium, erbium, and alloys or oxides thereof.

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26. The pigment flake of claim 23, wherein the magnetic layer comprises a material selected from the group consisting of Fe/Si, Fe/Ni, FeCo, Fe/Ni/Mo, and combinations thereof.

27. The pigment flake of claim 23, wherein the magnetic layer comprises a hard magnetic material.

28. The pigment flake of claim 23, wherein the magnetic layer comprises a material selected from the group consisting of $SmCo_5$, $NdCo_5$, Sm_2Co_{17}, $Nd_2Fe_{14}B$, $TbFe_2$, and combinations thereof.

29. The pigment flake of claim 23, wherein the magnetic layer comprises a material selected from the group consisting of Fe_3O_4, $NiFe_2O_4$, $MnFe_2O_4$, $CoFe_2O_4$, YIG, GdIG, and combinations thereof.

30. The pigment flake of claim 23, wherein the reflector layers comprise a reflective material selected from the group consisting of aluminum, silver, copper, gold, platinum, tin, titanium, palladium, nickel, cobalt, rhodium, niobium, chromium, and combinations or alloys thereof.

31. The pigment flake of claim 23, wherein the first and second dielectric layers comprise a dielectric material having an index of refraction of about 1.65 or less.

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32. The pigment flake of claim 23, wherein the dielectric material is selected from the group consisting of silicon dioxide, aluminum oxide, magnesium fluoride, aluminum fluoride, cerium fluoride, lanthanum fluoride, neodymium fluoride, samarium fluoride, barium fluoride, calcium fluoride, lithium fluoride, and combinations thereof.

33. The pigment flake of claim 23, wherein the first and second dielectric layers comprise a dielectric material having an index of refraction of greater than about 1.65.

34. The pigment flake of claim 23, wherein the dielectric material is selected from the group consisting of zinc sulfide, zinc oxide, zirconium oxide, titanium dioxide, diamond-like carbon, indium oxide, indium-tin-oxide, tantalum pentoxide, cerium oxide, yttrium oxide, europium oxide, iron oxides, hafnium nitride, hafnium carbide, hafnium oxide, lanthanum oxide, magnesium oxide, neodymium oxide, praseodymium oxide, samarium oxide, antimony trioxide, silicon monoxide, selenium trioxide, tin oxide, tungsten trioxide, and combinations thereof.

35. The pigment flake of claim 23, wherein the first and second dielectric layers have an optical thickness in a range from about 2 QWOT at a design wavelength of about 400 nm to about 9 QWOT at a design wavelength of about 700 nm.

36. The pigment flake of claim 23, wherein the first and second dielectric layers have substantially the same optical thickness.

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37. The pigment flake of claim 23, wherein the first and second dielectric layers are composed of the same material.

38. The pigment flake of claim 23, wherein the first and second dielectric layers are each composed of a dielectric optical stack having a plurality of alternating layers of a high index material and a low index material.

39. The pigment flake of claim 38, wherein the dielectric optical stack has a gradient index of refraction.

40. The pigment flake of claim 23, wherein the first and second dielectric layers are each composed of a mixture or multiple sublayers of dielectric materials selected from the group consisting of low index materials, high index materials, and combinations thereof.

41. The pigment flake of claim 23, wherein the first and second absorber layers comprise materials that are uniformly absorbing in the visible part of the electromagnetic spectrum.

42. The pigment flake of claim 23, wherein the first and second absorber layers comprise materials that are non-uniformly absorbing in the visible part of the electromagnetic spectrum.

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43. The pigment flake of claim 23, wherein the first and second absorber layers comprise an absorbing material selected from the group consisting of chromium, nickel, aluminum, silver, copper, palladium, platinum, titanium, vanadium, cobalt, iron, tin, tungsten, molybdenum, rhodium, niobium, carbon, graphite, silicon, germanium, and compounds, mixtures, or alloys thereof.

44. The pigment flake of claim 23, wherein the first and second absorber layers comprise an absorbing material selected from the group consisting of metal oxides, metal sulfides, metal carbides, and combinations thereof.

45. The pigment flake of claim 23, wherein the first and second absorber layers each have a physical thickness of about 30 Å to about 500 Å.

46. The pigment flake of claim 23, wherein the first and second absorber layers have substantially the same physical thickness.

47. The pigment flake of claim 23, wherein the first and second absorber layers are composed of the same material.

48. The pigment flake of claim 23, wherein the first and second reflector layers are on each of the first and second major surfaces but not on the at least one side surface of the magnetic layer.

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49. The pigment flake of claim 23, wherein the first and second reflector layers form part of a contiguous reflecting layer substantially surrounding the magnetic layer.

50. The pigment flake of claim 23, wherein the first and second absorber layers form part of a contiguous absorbing layer substantially surrounding the first and second dielectric layers and the magnetic core section.

51. The pigment flake of claim 23, wherein the first and second absorber layers form part of a contiguous absorbing layer substantially surrounding the first and second dielectric layers, and the first and second dielectric layers form a part of a contiguous dielectric layer substantially surrounding the magnetic core section.

52. A magnetic color shifting pigment composition comprising a plurality of color shifting pigment flakes, each of the pigment flakes having a multilayer structure substantially the same as the pigment flake defined in claim 23.

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A magnetic color-shifting colorant composition, comprising:

a pigment medium; and

a plurality of color-shifting pigment flakes dispersed in the pigment medium, the pigment flakes having a multilayer structure substantially the same as the pigment flake defined in claim 23.

53. The colorant composition of claim 0, wherein the pigment medium comprises a material selected from the group consisting of acrylic melamine, urethanes, polyesters, vinyl resins, acrylates, methyl methacrylate, ABS resins, epoxies, styrenes, ink and paint formulations based on alkyd resins, and mixtures thereof.

54. The colorant composition of claim 0, wherein the pigment medium is a paint or ink vehicle.

55. The colorant composition of claim 0, wherein the pigment flakes have a dimension on any surface thereof ranging from about 2 microns to about 200 microns.

56. The colorant composition of claim 0, wherein the pigment flakes have an aspect ratio of at least about 2 to1.

57. The colorant composition of claim 0, further comprising a plurality of non- color-shifting pigment flakes dispersed in the pigment medium.

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58. A magnetic pigment flake, comprising:

a central support layer having a first major surface, an opposing second major surface, and at least one side surface;

a first magnetic layer on the first major surface of the support layer; and

a second magnetic layer on the second major surface of the support layer;

wherein the pigment flake exhibits magnetic characteristics based on the relative magnetism of the magnetic layers.

59. The pigment flake of claim 58, wherein the support layer comprises a dielectric material.

60. The pigment flake of claim 59, wherein the dielectric material is selected from the group consisting of mica, coated mica, micaeous iron oxide, glass, talc, silicon dioxide, boron nitride, boron carbide, alumina, carbon, graphite, bismuth oxychloride, and combinations thereof.

61. The pigment flake of claim 58, wherein the first and second magnetic layers are on each of the first and second major surfaces but not on the at least one side surface of the support layer.

62. The pigment flake of claim 61, further comprising a first dielectric layer on the first magnetic layer and a second dielectric layer on the second magnetic layer.

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63. The pigment flake of claim 62, wherein the first and second dielectric layers are selectively absorbing and provide additional color effects to the pigment flake.

64. The pigment flake of claim 58, wherein the first and second magnetic layers form part of a contiguous magnetic layer substantially surrounding the support layer.

65. The pigment flake of claim 64, further comprising a dielectric layer substantially surrounding the contiguous magnetic layer.

66. The pigment flake of claim 65, wherein the dielectric layer is selectively absorbing and provides additional color effects to the pigment flake.

67. The pigment flake of claim 65, further comprising an absorber layer substantially surrounding the dielectric layer.

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68. The pigment flake of claim 67, wherein the dielectric layer is selectively absorbing and provides additional color effects to the pigment flake.

69. The pigment flake of claim 67, further comprising a reflector layer interposed between the magnetic layer and the dielectric layer.

70. The pigment flake of claim 58, wherein the magnetic layers comprise a soft magnetic material.

71. The pigment flake of claim 58, wherein the magnetic layers are composed of a material with a coercivity of less than about 2000 Oe.

72. A magnetic colorant composition, comprising:

a pigment medium; and

a plurality of pigment flakes dispersed in the pigment medium, the pigment flakes having a multilayer structure substantially the same as the pigment flake defined in claim 58.

73. The colorant composition of claim 72, wherein the pigment medium is a paint or ink vehicle.

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74. A magnetic pigment flake, comprising:

a central magnetic layer having a first major surface, an opposing second major surface, and at least one side surface;

a first dielectric layer on the first major surface of the magnetic layer; and

a second dielectric layer on the second major surface of the magnetic layer;

wherein the dielectric layers provide increased rigidity, durability, and corrosion resistance to the pigment flake, with the pigment flake exhibiting magnetic characteristics based on the relative magnetism of the magnetic layer.

75. The pigment flake of claim 74, wherein the first and second dielectric layers are selectively absorbing and provide additional color effects to the pigment flake.

76. The pigment flake of claim 74, wherein the magnetic layer comprises a soft magnetic material.

77. The pigment flake of claim 74, wherein the magnetic layer is composed of a material with a coercivity of less than about 2000 Oe.

78. The pigment flake of claim 74, wherein the first and second dielectric layers are on each of the first and second major surfaces but not on the at least one side surface of the magnetic layer.

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79. The pigment flake of claim 78, further comprising a first absorber layer on the first dielectric layer and a second absorber layer on the second dielectric layer.

80. The pigment flake of claim 78, further comprising an absorber layer substantially surrounding the first and second dielectric layers and the magnetic layer.

81. The pigment flake of claim 74, wherein the first and second dielectric layers form part of a contiguous dielectric layer substantially surrounding the magnetic layer.

82. The pigment flake of claim 81, wherein the contiguous dielectric layer is selectively absorbing and provides additional color effects to the pigment flake.

83. The pigment flake of claim 81, further comprising an absorber layer substantially surrounding the flake.

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84. A color shifting pigment flake, comprising:

a magnetic core section having a top surface, a bottom surface, and at least one side surface;

a dielectric layer on the top surface and the bottom surface but not on the at least one side surface of the magnetic core section; and

an absorber layer substantially surrounding the dielectric layer and in contact with the at least one side surface of the magnetic core section.

85. The pigment flake of claim 85, wherein the magnetic core section includes a magnetic layer.

86. The pigment flake of claim 85, wherein the magnetic core section comprises:

a central magnetic layer having a first major surface, an opposing second major surface, and at least one side surface; and

a first reflector layer on the first major surface of the magnetic layer, and an opposing second reflector layer on the second major surface of the magnetic layer.

87. The pigment flake of claim 86, wherein the first and second reflector layers are on each of the first and second major surfaces but not on the at least one side surface of the magnetic layer.

88. The pigment flake of claim 86, wherein the first and second reflector

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layers form part of a contiguous reflecting layer substantially surrounding the magnetic layer.

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89. A magnetic pigment flake, comprising:

a magnetic core having a first major surface, an opposing second major surface, and at least one side surface;

a first colored layer on the first major surface of the magnetic core; and

a second colored layer on the second major surface of the magnetic core.

90. The pigment flake of claim 89, wherein the magnetic core comprises a monolithic magnetic layer.

91. The pigment flake of claim 89, wherein the magnetic core comprises a multilayer magnetic structure.

92. The pigment flake of claim 92, wherein the multilayer magnetic structure comprises the coating structure Al/Fe/Al.

93. The pigment flake of claim 89, wherein the first and second colored layers are on each of the first and second major surfaces but not on the at least one side surface of the magnetic core.

94. The pigment flake of claim 89, wherein the first and second colored layers form part of a contiguous colored layer substantially surrounding the magnetic core.

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95. The pigment flake of claim 89, wherein the first and second colored layers comprise an organic dye.

96. The pigment flake of claim 96, wherein the organic dye is selected from the group consisting of copper phthalocyanine, perylene-based dyes, anthraquinone-based dyes, azo dyes, azo metal dyes, and combinations thereof.

97. The pigment flake of claim 96, wherein the colored layers each have a physical thickness of about 0.05 μm to about 5 μm.

98. The pigment flake of claim 89, wherein the first and second colored layers comprise an inorganic colorant material.

99. The pigment flake of claim 99, wherein the inorganic colorant material is selected from the group consisting of titanium nitride, chromium nitride, chromium oxide, iron oxide, cobalt-doped alumina, colored metallics, and combinations thereof.

100. The pigment flake of claim 99, wherein the colored layers each have a physical thickness of about 0.05 μm to about 0.10 μm.

101. The pigment flake of claim 89, wherein the first and second colored layers comprise a sol-gel matrix holding a colored pigment or dye.

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102. A color shifting foil device, comprising:

a magnetic layer;

a reflector layer overlying the magnetic layer;

a dielectric layer overlying the reflector layer; and

an absorber layer overlying the dielectric layer;

wherein the foil exhibits a discrete color shift such that the foil has a first color at a first angle of incident light or viewing and a second color different from the first color at a second angle of incident light or viewing.

103. The foil of claim 102, wherein the magnetic layer comprises a soft magnetic material or a hard magnetic material.

104. The foil of claim 102, further comprising a web carrier with either the magnetic layer or the absorber layer deposited on the web carrier.

105. The foil of claim 104, wherein the web carrier further comprises a release layer thereon disposed between the web carrier and the magnetic layer, or the web carrier and the absorber layer.

106. The foil of claim 104, further comprising an adhesive layer for laminating the foil to a substrate.

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107. The foil of claim 106, wherein the adhesive layer is selected from the group consisting of a hot stampable adhesive, a pressure sensitive adhesive, a permanent adhesive, a transparent adhesive, and a UV curable adhesive.

108. The foil of claim 106, wherein the adhesive layer is overlying the magnetic layer or the absorber layer.

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109. An optical article comprising:

a substrate having first and second non-overlapping regions on a surface of the substrate;

a magnetic pigment coating structure overlying the first region, the magnetic pigment coating structure including a plurality of multilayer magnetic pigments dispersed in a solidified pigment vehicle, the magnetic properties of the pigment coating structure being provided by a non-optically observable magnetic layer within each of the multilayer magnetic pigments; and

a non-magnetic pigment coating structure overlying the second region, the non-magnetic pigment coating structure including a plurality of multilayer non-magnetic pigments dispersed in a solidified pigment vehicle.

110. The article of claim 109, wherein the non-magnetic pigment coating structure has a substantially identical color as the magnetic pigment coating structure.

111. The article of claim 109, wherein one or both of the magnetic pigment and non-magnetic pigment coating structures have discrete color shifting effects.

112. The article of claim 109, wherein the magnetic pigment and non-magnetic pigment coating structures have substantially identical color shifting effects.

113. The article of claim 109, wherein the magnetic pigment and non-magnetic pigment coating structure have different color shifting effects.

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114. An optical article comprising:

a substrate having an upper surface region;

a magnetic pigment coating structure overlying the upper surface region of the substrate, the magnetic pigment coating structure including a plurality of multilayer magnetic pigments dispersed in a solidified pigment vehicle, the magnetic properties of the pigment coating structure being provided by a non-optically observable magnetic layer within each of the multilayer magnetic pigments; and

a non-magnetic pigment coating structure overlying at least a portion of the magnetic pigment coating structure, the non-magnetic pigment coating structure including a plurality of non-magnetic pigments dispersed in a solidified pigment vehicle.

115. The article of claim 114, wherein the non-magnetic pigment coating structure has a substantially identical color as the magnetic pigment coating structure.

116. The article of claim 114, wherein one or both of the magnetic pigment and non-magnetic pigment coating structures have discrete color shifting effects.

117. The article of claim 114, wherein the magnetic pigment and non-magnetic pigment coating structures have substantially identical color shifting effects.

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118. An optical article comprising:

a substrate having an upper surface region;

a non-magnetic pigment coating structure overlying the upper surface region of the substrate, the non-magnetic pigment coating structure including a plurality of non-magnetic pigments dispersed in a solidified pigment vehicle; and

a magnetic pigment coating structure overlying the magnetic pigment coating structure including a plurality of multilayer magnetic pigments dispersed in a solidified pigment vehicle, the magnetic properties of the pigment coating structure being provided by a non-optically observable magnetic layer within each of the multilayer magnetic pigments.

119. The article of claim 118, wherein the non-magnetic pigment coating structure has a substantially identical color as the magnetic pigment coating structure.

120. The article of claim 118, wherein one or both of the magnetic pigment and non-magnetic pigment coating structures have discrete color shifting effects.

121. The article of claim 118, wherein the magnetic pigment and non-magnetic pigment coating structures have substantially identical color shifting effects.

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122. An optical article comprising:

a substrate having first and second non-overlapping regions on a surface of the substrate;

a multilayer magnetic foil structure overlying the first region, the magnetic properties of the foil structure provided by a magnetic layer which is not optically observable; and

a non-magnetic foil structure overlying the second region.

123. The article of claim 122, wherein the non-magnetic foil structure has a substantially identical color as the magnetic foil structure.

124. The article of claim 122, wherein one or both of the magnetic foil structure and the non-magnetic foil structure have discrete color shifting effects.

125. The article of claim 122, wherein the magnetic foil structure and the non-magnetic foil structure have substantially identical color shifting effects.

126. The article of claim 122, wherein the magnetic foil structure and the non-magnetic foil structure have different color shifting effects.

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127. An optical article comprising:

a substrate having an upper surface region;

a multilayer magnetic foil structure overlying the upper surface region of the substrate, the magnetic properties of the magnetic foil structure provided by a magnetic layer which is not optically observable; and

a non-magnetic foil structure overlying at least a portion of the magnetic foil structure.

128. An optical article comprising:

a substrate having an upper surface region;

a non-magnetic foil structure overlying the upper surface region of the substrate; and

a multilayer magnetic foil structure overlying at least a portion of the non-magnetic foil structure, the magnetic properties of the magnetic foil structure provided by a magnetic layer which is not optically observable.

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129. A magnetic pigment flake, comprising:

a magnetic core section including:

a central magnetic layer having a first major surface, an opposing second major surface, and at least one side surface; and

a first reflector layer on the first major surface of the magnetic layer, and an opposing second reflector layer on the second major surface of the magnetic layer; and

a first dielectric layer overlying the first reflector layer, and a second dielectric layer overlying the second reflector layer, the first and second dielectric layers composed of dielectric optical stacks including alternating high index and low index materials.

130. The pigment flake of claim 130, wherein the first and second dielectric layers have coating structures selected from the group consisting of $(HL)^n$, $(LH)^n$, $(LHL)^n$, and $(HLH)^n$, where n = 1-100 and the L and H layers are 1 QW at a design wavelength.

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